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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/556,666

11/10/2005

Son-Ha Giang

Serie 6288

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03/16/2010

AIR LIQUIDE

Intellectual Property

2700 POST OAK BOULEVARD, SUITE 1800

HOUSTON, TX 77056

EXAMINER

SAVANI, AVINASH A

ART UNIT

PAPER NUMBER

3749

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/556,666	Applicant(s) GIANG ET AL.	
	Examiner AVINASH SAVANI	Art Unit 3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 28,30,31,34-36 and 38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 28,30,31,34-36 and 38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/7/2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

1. The following action is in response to the applicant's Amendment dated 12/21/2009, that was in response to the Office action dated 7/20/2009. Claims 28, 30, 31, 34-36 and 38 are pending, claim 28 has been amended, while claims 30, 31, 34-36 and 38 are presented as previously claimed, and claims 1-27, 29, 32, 33 and 37 have been cancelled by way of previous amendments.

Response to Arguments

2. Applicant's arguments with respect to claims 28, 30, 31, 34-36 and 38 have been considered but are moot in view of the new ground(s) of rejection. In light of the new claim amendment, it is believed that the applicant has successfully amended over the prior art of reference, however in view of the newly found art, all pending claims stand rejected. According to the applicant, the previous art did not show the flow regulating means of the additional gas, wherein the applicant remarked in the 12/21/2009 response that "There is no disclosure of the supply of a flow of additional gas to the burner if the total flow of fuel and air were to be insufficient for cooling the burner. Indeed, as explained above, such a problem doesn't normally arise with air-fuel burners." This clarification will be used to interpret the claim limitation of the Dmin value.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over

Kobayashi [6200128], further in view of Ibaraki et al [5891404].

6. With respect to claim 28, Kobayashi discloses an apparatus which may be used as a combustion system, said apparatus comprising: a) an oxyfuel burner [see FIG 2]; b) a first duct adapted to feed said burner with fuel (4); c) a second duct adapted to feed said burner with an oxidizer comprising oxygen and an additional gas (2); d) an oxygen feeder (16); e) an additional gas feeder, wherein said second duct cooperates with said oxygen feeder and said additional gas feeder [col 3, line 33-54]; f) a flow rate measurement device, wherein said flow rate comprises at least one member selected from the group consisting of: 1) said oxygen's flow rate; and 2) said fuel's flow rate [col 3, line 55-col 4, line 7, col 4, line 21-25]; (the flow rate measurement device is believed to be present in light of the oxidant stream 16 is controlled). Kobayashi however does not disclose g) a flow rate control device. Ibaraki teaches a similar device adapted to control said additional gas's flow rate, wherein said flow rate control device is slaved to said flow rate measurement device so that a sum of the additional gas, oxygen and fuel

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flow rates are greater than a preset minimum flow rate DMIN, wherein DMIN is the minimum flow rate through the burner required for cooling the burner during combustion so as to prevent structural thermal damage to the burner [col 3, line 51-col 4, line 59]. In view of Ibaraki, an additional gas flow, or cooling air is introduced, after an initial flow of air and fuel, and acts to serve as an overheating means for the flame tube. It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide an additional gas flow rate control because the technique of adding the additional gas was known, yielding the predictable result of preventing harmful damage to the burner tube.

7. Claims 30, 34 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi ['128], in view of Ibaraki et al ['404], further in view of Baysinger [4034911].

8. With respect to claim 30, Kobayashi discloses the flow rate control device but does not disclose the pressure regulator. Baysinger teaches a similar device wherein the flow rate control device comprises a pressure regulator [col 6, line 41-58]. In view of Baysinger, the pressure is controlled in order to prevent gas build up. It would have been obvious to a person of ordinary skill in the art at the time of the invention to include a pressure regulator because it was known that gas build-up can compromise burner operation, yielding the predictable result of lowering the pressure when needed to allow proper burner efficiency and regulating the pressure is predictable in that the temperature after complete combustion of the products will be in range to produce a suitable flame.

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9. With respect to claim 34, Kobayashi discloses the apparatus of claim 30, however does not disclose the flow rate control device as further claimed. Baysinger teaches a similar flow rate controller wherein a technique is used to allow a flow rate of one fluid until a pressure generated by another fluid is sufficient [col 2, line 46-65]. In view of Baysinger the rate of gas flow to the burner is regulated due to the pressure sufficiency of the main gas valve. Therefore, if used to modify Kobayashi, Baysinger would provide a flow rate control device that allows the feeding of the additional gas until a pressure generated by the additional gas and the oxygen fed to the burner is sufficient to achieve a flow rate of oxidizer greater than DMIN, the flow rate of the oxidizer being a sum of the flow rates of the oxygen and the additional gas. It would have been obvious to a person of ordinary skill in the art at the time of the invention to allow feeding of additional gas until a pressure of other gases are reached because the technique was known, yielding the predictable result of allowing a proper amount of gas pressure without exceeding an unsafe value.

10. With respect to claim 38, Kobayashi discloses the apparatus of claim 28, however does not disclose adjust the flow rates above a DMIN value as further claimed. Baysinger teaches a similar device wherein flow rate control device adapted to control said additional gas's flow rate, wherein said flow rate control device is slaved to said flow rate measurement device so that a sum of the additional gas, oxygen and fuel flow rates are greater than a preset minimum flow rate DMIN [col 11, line 28-46]. A temperature decrease implies that a flow rate is less than a minimum, and therefore the increase in the conduction of the transistor allows for greater increase in flow rates

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above a minimum. In view of Baysinger, there is a flow rate control device slaved so that a minimum flow rate is not maintained but instead increased. It would have been obvious to a person of ordinary skill in the art at the time of the invention to allow a flow rate control device maintain a flow rate above minimum because the technique was known in the art, yielding the predictable result of maintaining a desired temperature and to allow efficient burner operation.

11. Claims 31, 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi ['128], in view of Ibaraki et al ['404], further in view of Versluis [5630408].

12. With respect to claim 31, Kobayashi discloses the apparatus of claim 28, wherein there is a flow rate control device, however does not disclose the servovalve as the flow rate control device. Versluis teaches a similar device wherein the additional gas flow rate is controlled by a servo valve [col 47-54]. In view of Versluis, a servovalve is used to monitor pressure at a burner end. It would have been obvious to a person of ordinary skill in the art at the time of the invention to have the additional gas flow rate controlled by a servovalve because it was recognized that burner pressure must be controlled.

13. With respect to claim 35, Kobayashi discloses the apparatus of claim 31, however does not further disclose the servovalve.

14. With respect to claim 36, Kobayashi discloses the apparatus of claim 36, however does not disclose calculating the oxygen/fuel stoichimetric ratio.

15. With regards to claims 35 and 36, Kobayashi discloses the apparatus, however Versluis discloses the servovalve controls the feeding of the additional gas by slaving

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an opening of the additional gas feeder to a control value selected from the group consisting of a flow rate of the oxygen and a flow rate of the fuel, the slaving of the opening to the control value taking into account a fixed oxygen/fuel stoichiometric ratio [col 9, line 23-40], and a similar apparatus, wherein the additional gas is air and the slaving of the opening to the control valve takes into account a supply of oxygen from the air in calculating the oxygen/fuel stoichiometric ratio [col 9, line 40-45]. In view of Versluis, the servovalve controls the feeding of the gas and calculates the stoichiometric ratio as further claimed. It would have been obvious to a person of ordinary skill in the art at the time of the invention to use a servovalve because the option was known, yielding the predictable result of controlling the flow of gas based on the amount of another gas present in order to ensure sufficient amounts of gas for combustion, wherein it is then understood that the stoichiometric ratio is accounted for since the air, oxygen and fuel are controlled to a specific amount.

Conclusion

16. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AVINASH SAVANI whose telephone number is (571)270-3762. The examiner can normally be reached on Monday- Friday, alternate Fridays off, 7:30-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven McAllister can be reached on 571-272-6785. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Avinash Savani/
Examiner, Art Unit 3749

/Steven B. McAllister/
Supervisory Patent Examiner, Art Unit
3749

/A. S./
3/12/2010